

## AMENDMENT TO THE CLAIMS

1. (Currently amended) A process analytic system comprising:

a device for sensing a concentration of a combustible ~~specie~~ species of interest  $\tau$  in an exhaust stream;

a controller coupled to the device and configured to receive measurements of the concentration of the combustible species; and

a blowback system coupled to the device and the controller, the blowback system being configured to responsively reverse gas flow through the device;

wherein the device ~~including~~ comprises:

a holder;

a first RTD disposed in a first cover, wherein the first cover is mounted to the holder;

a second RTD disposed in a second cover, wherein the second cover is mounted to the holder; and

wherein the first cover comprises a catalyst thereon which has a higher catalytic activity to the ~~specie~~ species of interest than the second cover, at a catalytic activity rate that is resistant to change as a function of elevated temperature or the presence of sulfur.

2. (Original) The device of claim 1 wherein the first cover is formed from a tube.

3. (Original) The device of claim 1 wherein the second cover is formed as a tube.

4. (Currently amended) The device of claim 1 wherein the catalyst is disposed on the first cover has as a catalyst film disposed thereon.

5. (Currently amended) The device of claim 4 1 wherein the ~~film~~  
~~is-metal~~ catalyst comprises doped lanthanum manganite.

6. (Currently amended) The device of claim 5 1 wherein the ~~metal~~  
~~is-platinum~~ catalyst comprises doped ceria.

7. (Canceled)

8. (Currently amended) The device of claim 4 1 wherein the ~~film~~  
~~is-a~~ catalyst comprises perovskite.

9. (Currently amended) The device of claim 4 1 wherein the ~~film~~  
~~is~~ catalyst comprises hopcalite.

10. (Original) The device of claim 1 wherein the second cover is  
constructed from a catalyst-free stainless steel tube.

11. (Original) The device of claim 1 wherein at least one of the  
first and second cover is joined to the holder using thermally  
insulative material.

12. (Original) The device of claim 11 wherein the thermally  
insulative material is selected from the group of ceramic cement,  
adhesive, and high-temperature epoxy.

13. (Currently amended) A process analytic system comprising:  
    a device configured for determining a concentration of a  
        combustible specie species of interest in an exhaust  
        stream;  
    a controller coupled to the device and configured to receive  
        measurements of the concentration of the combustible  
        species; and

a blowback system coupled to the device and the controller,  
the blowback system being configured to responsively  
reverse gas flow through the device;

wherein the device including comprises:

a solid electrolyte;

a reference electrode that is inactive to the  
combustion reaction; and

a working electrode that is catalytically active to the  
combustion reaction, and wherein the working  
electrode and the reference electrode are coupled  
to the solid electrolyte and are adapted for  
resistance to elevated temperature and to the  
presence of sulfur.

14. (Original) The device of claim 13 wherein the reference and  
working electrodes are couplable to the exhaust stream.

15. (Original) The device of claim 13 wherein the solid  
electrolyte is selected from the group consisting of doped  
zirconia, ceria, and bismuth oxide.

16. (Original) The device of claim 13 wherein the reference  
electrode is constructed from gold.

17. (Original) The device of claim 13 wherein the reference  
electrode is constructed from doped lanthanoid chromite.

18. (Original) The device of claim 13 wherein the working  
electrode is constructed from platinum.

19. (Original) The device of claim 13 wherein the working  
electrode is constructed from a metal oxide.

20. (Currently amended) The device of claim ~~19~~ 13 wherein the working electrode film is constructed using doped ceria.

21. (Currently amended) The device of claim ~~19~~ 13 wherein the working electrode film is constructed using doped lanthanum manganite.

22. (Currently amended) The device of claim ~~19~~ 13 wherein the working electrode film is constructed using a perovskite.

23. (Currently amended) A process analytic system comprising:  
    a solid state device for determining the concentration of  
        oxygen in a gas phase;  
    a controller coupled to the solid state device and  
        configured to receive measurements of the concentration  
        of the oxygen; and  
    a blowback system coupled to the solid state device and the  
        controller, the blowback system being configured to  
        responsively reverse gas flow through the solid state  
        device;  
    wherein the solid state device comprising comprises:  
        a solid electrolyte;  
        a reference electrode coupled to the solid electrolyte;  
        and  
        a working electrode constructed from a mixed  
            ion/electron conducting oxide, wherein the working  
            electrode is coupled to the solid electrolyte and  
            is adapted for resistance to ambient sulfur and to  
            elevated temperature.

24. (Original) The device of claim 23 wherein the solid electrolyte is selected from the group consisting of doped zirconia and ceria.

25. (Original) The device of claim 23 wherein the reference electrode is constructed from the group consisting of platinum, a metal oxide electrode, and a mixed conducting electrode.

26. (Original) The device of claim 25 wherein the metal oxide electrode includes perovskite structure.

27. (Original) The device of claim 25 wherein the metal oxide electrode includes oxide with fluorite structure.

28. (Original) The device of claim 23 wherein the working electrode is constructed from ceria or its solid solution doped with at least one mixed valency element.

29. (Original) The device of claim 28 wherein the mixed valency element is one of terbium and praseodymium.

30. (Currently amended) The device of claim 23 wherein the working electrode is constructed from a ~~solid solution of ceria doped with at least one mixed valency element~~ doped lanthanum manganite.

31. (Canceled)

32. (Original) A process analytic system comprising:

    a sample probe having at least one sulfur-resistant sensor disposed therein;

    a controller coupled to the sample probe to measure a parameter of an exhaust stream; and

    a blowback system coupled to the sample probe and the controller to responsively reverse gas flow through the sample probe.

33. (Original) The system of claim 32, wherein the sample probe includes a plurality of sulfur-resistant sensors.

34. (Original) The system of claim 32, wherein the sensor is an oxygen sensor.

35. (Original) The system of claim 32, wherein the sensor is a combustibles sensor.

36. (Original) The system of claim 32, wherein the sample probe includes a particulate filtering enclosure.